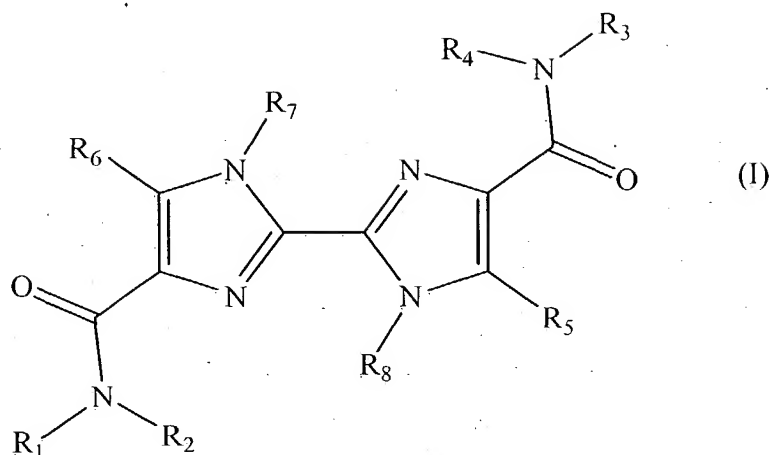


**THAT WHICH IS CLAIMED IS:**

1. A compound of Formula I:



wherein:

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are each independently H, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, alkylaryl, substituted alkylaryl, arylalkyl, substituted arylalkyl, alkoxy, substituted alkoxy, arylalkenyl, substituted arylalkenyl, arylalkynyl, substituted arylalkynyl, aroyl, acyl, heterocyclic, substituted heterocyclic, halogen, cyano, nitro, macrocyclic ligand, and lipophilic groups;

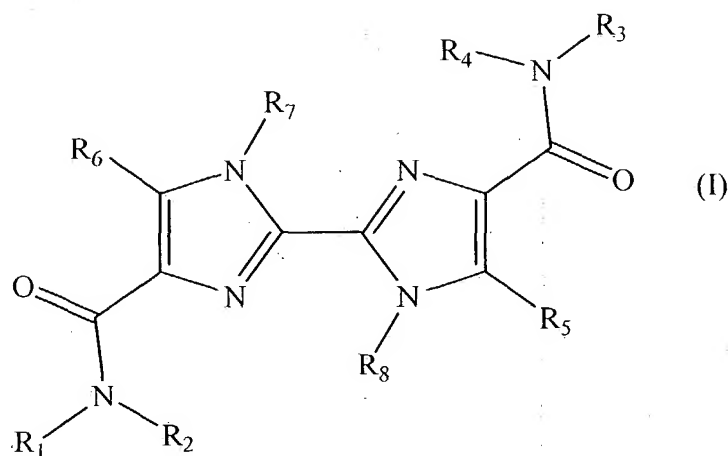
R<sub>5</sub> and R<sub>6</sub> are each independently H, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, alkylaryl, substituted alkylaryl, arylalkyl, substituted arylalkyl, alkoxy, substituted alkoxy, arylalkenyl, substituted arylalkenyl, arylalkynyl, substituted arylalkynyl, aroyl, acyl, heterocyclic, substituted heterocyclic, halogen, cyano, nitro, or a macrocyclic ligand; and

R<sub>7</sub> and R<sub>8</sub> are each independently H or lower alkyl.

2. The compound of claim 1, wherein at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is a macrocyclic ligand.

3. The compound of claim 1, wherein at least one of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is a lipophilic group.

4. The compound of claim 1 immobilized on a solid support.
5. The compound of claim 1 further comprising an anion bound thereto.
6. The compound of claim 1, wherein said anion is sulfate.
7. A method of binding an anion, comprising contacting an anion to a compound according to claim 1 so that said anion is bound thereto.
8. The method of claim 7, wherein said anion is sulfate.
9. A method of extracting an anion from a mixed composition containing the same, comprising the steps of:
  - (a) contacting said mixed composition to a binding compound of Formula I so that said anion is bound thereto;



wherein:

$R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  are each independently H, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, alkylaryl, substituted alkylaryl, arylalkyl, substituted arylalkyl, alkoxy, substituted alkoxy, arylalkenyl, substituted arylalkenyl, arylalkynyl, substituted arylalkynyl, aroyl, acyl, heterocyclic, substituted heterocyclic, halogen, cyano, nitro, macrocyclic ligand or lipophilic groups;

$R_5$  and  $R_6$  are each independently H, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl,

substituted aryl, alkylaryl, substituted alkylaryl, arylalkyl, substituted arylalkyl, alkoxy, substituted alkoxy, arylalkenyl, substituted arylalkenyl, arylalkynyl, substituted arylalkynyl, aroyl, acyl, heterocyclic, substituted heterocyclic, halogen, cyano, nitro, or a macrocyclic ligand; and

5  $R_7$  and  $R_8$  are each independently H or lower alkyl; and then

(b) separating said binding compound from said mixed composition to thereby extract said anion from said mixed composition.

10 10. A method according to claim 9, wherein said mixed composition comprises nuclear waste material, and said method further comprising the step of vitrifying said mixed composition following said separating step.

11. A method of claim 9, wherein said binding compound is immobilized on a solid support.

15

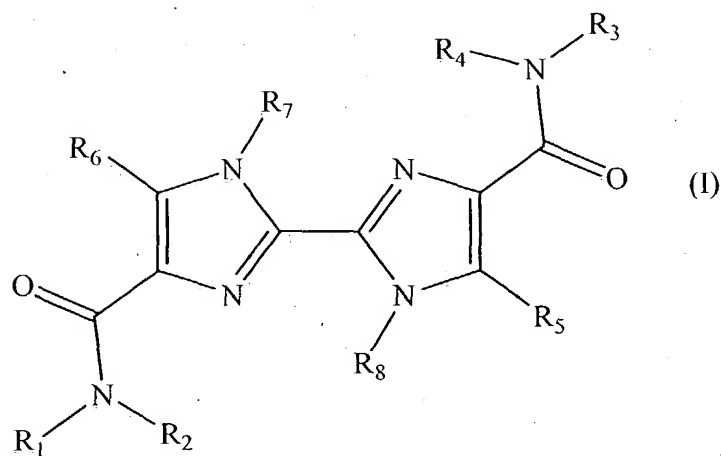
12. The method of claim 9, wherein at least one of  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  is a macrocyclic ligand.

13. The method of claim 9, wherein at least one of  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  is a lipophilic group.

20

14. A method of detecting an anion, comprising the steps of:

(a) contacting an anion to a binding compound of Formula I



25

wherein:

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are each independently H, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, alkylaryl, substituted alkylaryl, arylalkyl, substituted arylalkyl, alkoxy, substituted alkoxy, arylalkenyl, substituted arylalkenyl, arylalkynyl, substituted arylalkynyl, aroyl, acyl, heterocyclic, substituted heterocyclic, halogen, cyano, nitro, macrocyclic ligand or lipophilic groups;

R<sub>5</sub> and R<sub>6</sub> are each independently H, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, alkenyl, substituted alkenyl, alkynyl, substituted alkynyl, aryl, substituted aryl, alkylaryl, substituted alkylaryl, arylalkyl, substituted arylalkyl, alkoxy, substituted alkoxy, arylalkenyl, substituted arylalkenyl, arylalkynyl, substituted arylalkynyl, aroyl, acyl, heterocyclic, substituted heterocyclic, halogen, cyano, nitro, or a macrocyclic ligand; and

R<sub>7</sub> and R<sub>8</sub> are each independently H or lower alkyl; and then

(b) determining the fluorescence of said compound, wherein said compound is less fluorescent when said anion is bound thereto, to thereby detect said anion.

15. The method of claim 14, wherein said contacting step is carried out by combining said anion and said compound in a common liquid solution.

20

16. The method of claim 15, wherein said liquid solution comprises dichloromethane.

17. The method of claim 14, wherein said determining step is carried out by fluorometry.

25